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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/564,866	JAHAN ET AL.
	Examiner	Art Unit	
	TANMAY SHAH	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>24 March 2011</u>.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>15 and 17-28</u> is/are pending in the application.

   4a) Of the above claim(s) <u>1-14 and 16</u> is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>15 and 17-28</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☒ All   b)☐ Some * c)☐ None of:

   1. ☒ Certified copies of the priority documents have been received.

   2. ☐ Certified copies of the priority documents have been received in Application No. _____.

   3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1.   This communication is in response to the Amendment to Application 10/564,866

filed 2/18/11.

Response to Arguments

2.   Applicant's arguments filed 2/18/11 have been fully considered but they are not

persuasive.

I.   Rejection under USC 102

A.   **Claim 15**

3.   Applicant argues that Magee does not teach of disclose two steps of estimation

but a single estimation. Applicant then argues in detail that the estimation is performed

with FFT not by interpolation and no calculation of an error vector in phase and

amplitude for each pilot is performed.

4.   In response to above-mentioned arguments, applicant's interpretation of the

applied reference has been considered. However, the applied reference teaches

limitations of argued matter.

5.   **Applicant is reminded that a rejection is made en light of the entire**

reference cited by examiner and according to MPEP 2111 [R-5], during

prosecution the claim is given broadest reasonable interpretation.

6.   Examiner believes Magee teaches and disclose each and every element of claim

15. Examiner now explains his interpretation with use of Fig. 1- 3 and detailed

description in reference to each claim limitation.

7.   First, Magee teaches as extracting said at least one reference pilot present in

each of said symbols. As shown in Fig. 1 and disclosed in paragraph 23, The channel

estimator 20 <u>extracts pilot</u> tones (e.g., training tones) from the frequency domain signal

and then performs an IFFT to get the channel impulse response for a data burst. The

data burst is a time period which can contain one or more symbols or packets as known

in the art.

8.   Magee also discloses obtaining first estimate of said propagation channel by

time/frequency interpolation on said extracted at least one reference pilot. As described

above Magee teaches extracting pilot (so it teaches extracting at least one reference

pilot), and also as shown in Fig. 1 and Fig. 2 and Fig. 7 and disclosed in paragraph 23

and paragraph 77, the channel estimator extracts pilot tones from the frequency domain

signal and then performs an IFFT to get channel impulse response for a data burst.

Then the current impulse response is zero padded at 712 (Fig. 2 and Fig. 7). Frequency

domain interpolation is performed at 714 by computing a FFT of the current channel

impulse response (paragraph 77). This is the first estimate as claimed (since it is

performed using frequency interpolation).

9.   Magee also discloses independently correcting at least one of the pilot, in phase
and amplitude, and as a function of said first estimate, to output a corrected pilot with
phase and amplitude correction, said correction step including a step to calculate an
amplitude and phase error vector for each of said at least one reference pilot. (The
channel estimator may provide additional correction, based on channel responses at the
training tones, to the impulse response, such as amplitude and phase correction,
Examiner again emphasizes that it is performed for each burst, so the process is being
performed independently, as shown in Fig. 4, the process is performed with use of
creating offset vector, Although, only phase vector is shown but the description
discloses that the additional correction such as amplitude can be performed).

10.   Magee also discloses obtaining second estimate of propagation channel, by
analysis of said corrected pilot (As shown in Fig. 3, the corrected response is stored and
fed back to compare with the current impulse response, so the Examiner interprets as
the second estimate). Examiner further includes even if Examiner agree with the
applicant that fed back portion can not considered as the second estimate the as shown
in Fig. 1, the output of the channel estimator is fed to a data demodulator 22 and then
fed to the data postprocessing which performs error correction utilizing the information
provided by the data demodulator 24 in addition to providing block or packet formatting.
Examiner believes in order to perform the second correction the data has to be
estimated.

II. Rejection under USC 103

A.   **Claim 20**

11.   Examiner as described above Magee teaches all the limitations except "pilots
with an amplitude less than a first predetermined average threshold and/or greater than
a second predetermined maximum average threshold are rejected." Examiner cited
reference Zhang which discloses rejecting audio or digital signal which is less than
minimum average threshold, paragraph 113. It is obvious to one of ordinary skilled in
the art because the below minimum threshold values are practically useless and only
the signals above can be used for further processing.

B.   **Claim 26**

12.   Regarding claim 26, Examiner as described above Magee teaches all the
limitations except " for correction of at least one phase and/or amplitude error common
to two cells in a same OFDM...type symbol". Examiner cited another reference Fujii
which discloses deficiency of Magee. Fujii disclose environment in which
identical channel interference is also received from other cells, as in OFDM-CDMA, the
known signal also is influenced by identical channel interference and a problem which
arises is a decline in phase –error detection precision ascribable to carrier frequency

offset, page 7, col 1 – 7. It is obvious to one of ordinary skilled in the art because based

on the error or offset the correction can be performed.

Claim Rejections - 35 USC § 102

13.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in
> public use or on sale in this country, more than one year prior to the date of application for patent in
> the United States.

14.   Claims 15, 17 - 19, 21 - 25 and 27 - 28 are rejected under 35 U.S.C. 102(b) as

being anticipated by Magee (US 2003/0086508).

Regarding claim 15, Process for estimating a propagation channel formed by

successive symbols of a multi-carrier signal, each symbol comprising at least one

reference pilot and a plurality of frequencies carrying data, the process comprising:

        extracting said at least one reference pilot present in each of said symbols; and

for each of said symbols (**the channel estimator 20 is present to provide the

impulse response of the communication channel during each data burst. The

channel estimator 20 <u>extracts pilot</u> tones, page 2, paragraph 23**):

        obtaining a first estimate of said propagation channel, by time/frequency

interpolation on said extracted at least one reference pilot (**the channel estimator 20

<u>extracts pilot</u> tones (e.g., training tones) from the frequency domain signal and

then performs an IFFT to get the channel impulse response (first estimate) for a**

data burst, page 2, paragraph 23, The current impulse response is zero padded at

712. Frequency domain interpolation is performed at 714 by computing a FFT of

the current channel impulse response, paragraph 77);

 independently correcting each of said at least one reference pilot, in phase and

amplitude, and as a function of said first estimate, to output a corrected pilot with phase

and amplitude correction (**The channel estimator 20 may provide additional**

<u>**corrections,**</u> **based on known channel responses at the training tones, to the**

impulse response, such as <u>**amplitude and phase corrections,**</u> **the process s**

performed for each burst separately (so it is independent)), said correction step

including a step to calculate an amplitude and phase error vector for each of said at

least one reference pilot (**i.e. offset vector, please refer to Fig. 6 for additional**

steps); and

 obtaining a second estimate of said propagation channel, by analysis of

said corrected pilot (**As shown in Fig. 3, the corrected response is stored and fed**

back to compare with the current impulse response, so the Examiner interprets

as the second estimate and Fig. 1, the output of the channel estimator is fed to a

data demodulator 22 and then fed to the data postprocessing which performs

error correction utilizing the information provided by the data demodulator 24 in

addition to providing block or packet formatting. Examiner submits in order to

perform the second correction the data has to be estimated).

Claim 16, cancelled.

Regarding claim 17, Process for estimating a propagation channel according to claim 15, wherein t-he said error vector calculation step includes averaging of a set of error vectors obtained on at least one symbol (**the channel impulse response is compared to a previous channel impulse response or an average channel impulse response to form a phase offset vector, page 1, paragraph 9**).

Regarding claim 18, Process for estimating a propagation channel according to claim 17, wherein t-he said averaging is calculated on each symbol (**the channel impulse response is compared to a previous channel impulse response or an average channel impulse response to form a phase offset vector, page 1, paragraph 9, the process is performed for each burst**).

Regarding claim 19, Process for estimating a propagation channel according to claim17, wherein said set of error vectors only includes error vectors that satisfy at least one predetermined quality criterion (**i.e. phase angel (considered a quality criteria for phase correction), paragraph 24**).

Regarding claim 21, Process for estimating a propagation channel according to claim 15, wherein said second estimate includes an equalisation step that depends on the first estimate (**the channel impulse response is compared to a previous channel impulse response or an average channel impulse response to form a phase offset vector, page 1, paragraph 9**).

Regarding claim 22, Process for estimating a propagation channel according to claim 21, wherein said equalisation step is performed on all carrier frequencies of each of said symbols (**the process is performed in frequency domain for all symbols, so it is for all carrier frequencies**).

Regarding claim 23, Process for estimating a propagation channel according to claim 21, wherein the process comprises a step after said equalisation step to calculate a pulse response of the propagation channel as a function of the at least one reference pilot equalized by the equalization step (**the channel impulse response is compared to a previous channel impulse response or an average channel impulse response to form a phase offset vector, page 1, paragraph 9, the process is performed for each burst**), for refining synchronisation of receivers in time (**phase and amplitude correction makes the signal synchronized**).

Regarding claim 25, the process for estimating propagation channel according to claim

17, 17, wherein said correction step of the at least one reference pilot also includes a

final step to correct all equalised useful carriers taking account of an average value

obtained as a result of said averaging (**The channel estimator zero pads the channel

impulse response and performs a FFT on the channel impulse response to

provide a frequency domain response commonly referred to as the channel

estimate, page 2, paragraph 23**).

Regarding claim 27, the device has substantially same limitations as claim 15, thus the

same rejection is applicable.

Regarding claim 28, the device has substantially same limitations as claim 15, thus the

same rejection is applicable.

Claim Rejections - 35 USC § 103

15.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set
forth in section 102 of this title, if the differences between the subject matter sought to be patented and
the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains.
Patentability shall not be negatived by the manner in which the invention was made.

16.   Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Magee

(US 2003/0086508) in further view of Zhang (US 2003/0112265).

Regarding claim 20, Magee discloses process for estimating a propagation channel

according claim 16, however does not specifically disclose preliminary step in which the

said pilots with an amplitude less than a first predetermined minimum average threshold

and/or greater than a second predetermined maximum average threshold are rejected.

Zhang discloses preliminary step in which the said pilots with an amplitude less

than a first predetermined minimum average threshold and/or greater than a second

predetermined maximum average threshold are rejected (**i.e. the predetermined**

minimum energy threshold 136 therefore only rejects some of the non-speech

audio in this example, page 3, paragraph 113).

It would have been obvious to one of the ordinary skilled in the art at the time the

invention was made to combine the teachings of Magee with Balaban. One would be

motivated to combine these teachings because in doing so it will provide the presence

of absence of a valid signal needed in the system.

17.   Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Magee

(US 2003/0086508) in further view of Fujji et al. (EP 1542384).

Regarding claim 26, Magee teaches Process for estimating a propagation channel according to claim 15, However does not specifically disclose further comprising using the process for correction of at least one phase and/or amplitude error common to two cells in a same OFDM Orthogonal Frequency Division Multiplex) type symbol.

Fujji teaches using the process for correction of at least one phase and/or amplitude error common to two cells in a same OFDM Orthogonal Frequency Division Multiplex) type symbol (**Consequently, in an environment in which identical channel interference is also received from other cells, as in OFDM-CDMA, the known signal also is influenced by identical channel interference and a problem which arises is a decline in phase -error detection precision ascribable to carrier frequency offset, page 7, col 1 - 7**).

It would have been obvious to one of the ordinary skilled in the art at the time the invention was made to combine the teachings of Magee with Fujji. One would be motivated to combine these teachings because in doing so it will provide estimation error in each cell and can correct the error in each cell.

Conclusion

18.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TANMAY SHAH whose telephone number is (571)270-3624. The examiner can normally be reached on Mon-Thu (7:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TANMAY K SHAH/
Examiner, Art Unit 2611

/Dac V. Ha/
for David Payne, SPE of Art Unit 2611